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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/573,402	03/23/2006	Biagio Passalacqua	NOTAR034US	8787

7663 7590 06/04/2009

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EXAMINER	
BUCHANAN, JACOB	

ART UNIT	PAPER NUMBER
4133	

MAIL DATE	DELIVERY MODE
06/04/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/573,402	PASSALACQUA, BIAGIO	
	Examiner	Art Unit	
	Jacob Buchanan	4133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☒ Claim(s) *5-15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 March 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *23 March 2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: "..all the cells. . As a" on page 6 line 3 should read "…all the cells. As a". Page 12, lines 9 and 15, "wherein said reservoir consists of one ore more" should read "wherein said reservoir consists of one or more". Brief Description of the Drawings lacks a description for Figure 3 on page 18.

Appropriate correction is required.

Claim Objections

2. Claim 1 is objected to because of the following informalities: "wherein said reservoir consists of one ore more porous layers" should read "wherein said reservoir consists of one or more porous layers" in lines 9 and 15. Appropriate correction is required.

3. Claims 5-15 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only and cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claims 5-15 have not been further treated on the merits.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-4 are rejected under 35 U.S.C. 102(e) as being anticipated by Johnsen et al. (US 2004/0121200).

Regarding claim 1, Johnsen discloses a molten carbonate fuel cell stack ([0018]) comprising a plurality of cells ([0005]) separated by an electronically conductive material (see "stainless steel separator plate", [0005]) which is impervious to gas, characterized by the combination of:

- A positive reservoir component (10) external to the cathode of the first cell (18)([0027]), wherein said reservoir (10) consists of one or more porous layers of electronically conductive material (12, 82) and comprises at least one gas distributor (50, 90)(see Figure 3 & 4B)
- A negative reservoir component (20) external to the anode of the last cell (28)([0027]), on the negative side of the stack, wherein said reservoir (20) consists of one or more porous layers of electronically conductive material (22)(Figure 2)
- Wherein both the reservoirs (10, 20) are in use exposed to the fuel gas environment ([0041], [0047])

Regarding claim 2, Johnsen discloses all of the claim limitations as set forth above. Johnsen additionally discloses a molten carbonate fuel cell ([0018]) wherein the positive reservoir (10) is separated from the cathode of the first cell (18) on the positive side of the stack by means of an electronically conductive material (12, 82) which is impervious to gas (see “austenitic stainless steel”, [0032]).

Regarding claim 3, Johnsen discloses all of the claim limitations as set forth above. Johnsen additionally discloses a molten carbonate fuel cell ([0018]) wherein the negative reservoir (20) is separated from the anode of the first cell (28) on the negative side of the stack by means of an electronically conductive material (12) which is impervious to gas (see “identical to the inactive anode part 12”, [0046]).

Regarding claim 4, Johnsen discloses all of the claim limitations as set forth above. Johnsen additionally discloses a molten carbonate fuel cell ([0018]) wherein the positive reservoir (10) is in use accessible to gases at least on one of the faces formed by the lateral surfaces of the cells ([0041]), in which fuel gas is present ([0041]) and which is separated from oxidant gases (see “in order to isolate the gas flows" [0041]).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kunz et al. (US Patent 4,761,348) in view of Mitsuda et al. (US Patent 5,019,644).

Regarding claim 1, Kunz discloses a molten carbonate fuel cell stack (10) comprising a plurality of cells (12) separated by an electronically conductive material (21) which is impervious to gas (C4/L15-18), characterized by the combination of:

- A positive reservoir component (27) external to the cathode of the first cell (C4/L51-54), on the positive side of the stack, wherein said reservoir (27) consists of one or more porous layers of electronically conductive material (C4/L63-66)
- A negative reservoir component (25, 41, 45) external to the anode (35) of the last cell (C5/L26-28), on the negative side of the stack, wherein said reservoir (25, 41, 45) consists of one or more porous layers of electronically conductive material (C4/L63-66)
- Wherein both the reservoirs (27, 25, 41, 45) are in use exposed to the fuel gas environment (C2/L44-47 & C2/L51-56, C5/L28-30, claim 5)

To clarify, Kunz discloses that a porous layer of electronically conductive material (27) (an electrolyte reservoir) at the **positive** end portion (the lower portion of the fuel cell stack in the reference) is exposed to the fuel gas supply (C2/L44-47). Additionally Kunz discloses in another aspect that an additional porous layer (an electrolyte reservoir) is placed at the **negative** end portion (the upper portion of the fuel cell stack in the reference) is exposed to the fuel gas supply (C2/L51-56). In a specific embodiment, Kunz discloses an additional porous plaque (41, 45) (an electrolyte reservoir) located above the anode at the top of the stack (Figure 4, C5/L20-22) (the **negative** end portion of the fuel cell stack in the reference) is open at its edge surface to the stack face at which fuel gas enters the anode (C5/L28-30). See column 4 lines 52-54 for clarity of top/bottom and negative/positive for this reference.

While Kunz discloses both positive and negative reservoirs in a molten carbonate fuel cell that are exposed to the fuel gas environment, the reference does not explicitly disclose a positive (lower) reservoir comprising at least one gas distributor.

Kunz additionally discloses an electrolyte reservoir (45) that includes use of channels (47) for forming a reactant gas passage (a gas distributor) that can be used in place of the anode-reservoir combination (the negative portion) (C5/L33-37).

Mitsuda discloses a molten carbonate fuel cell stack (20) comprising a plurality of cells (1) (Figure 1, C3/L11-13) and reservoir layers (13, 14 & 15, 16) (Figures 3 & 4 respectively). The reservoir layers (13, 14) as taught by Figure 3 can better prevent electrolyte migration than the reservoir layers (15, 16) as taught by Figure 4 (C5/L10-20). Mitsuda discloses that the reason may be because reservoir layers (15, 16) do not

have gas reaction flow paths (a gas distributor) and therefore contact with the reaction gases only occurs at their respective side surfaces of small areas (C5/L20-24). The result of lacking these gas reaction flow paths, as disclosed by Mitsuda, causes an insufficient delay of the manifestation of the effects of the electrolyte (C5/L10-18). In other words, reservoir layers lacking gas reaction flow paths do not resist the migration of electrolyte from the positive to the negative end of the stack as well as reservoirs with gas reaction flow paths, thereby impairing battery performance (C1/L32-34).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to add the channels for the negative electrolyte reservoir with the positive electrolyte reservoir as disclosed by Kunz to maintain battery performance by preventing electrolyte migration by using gas reaction flow paths in the reservoir layers as taught by Mitsuda.

Regarding claim 2, Kunz discloses all of the claim limitations as set forth above. Kunz additionally discloses a molten carbonate fuel cell (10) wherein the positive reservoir (27) is separated from the cathode of the first cell on the positive side of the stack (10) by means of an electronically conductive material (21, 21A) which is impervious to gas (see “stainless steel”, C4/L15-18).

Regarding claim 3, Kunz discloses all of the claim limitations as set forth above. Kunz additionally discloses a molten carbonate fuel cell (10) wherein the negative reservoir (25) is separated from the anode of the first cell on the negative side of the

stack (10) by means of an electronically conductive material (21, 21A) which is impervious to gas (see "stainless steel", C4/L15-18).

Regarding claim 4, Kunz discloses all of the claim limitations as set forth above. Kunz additionally discloses a molten carbonate fuel cell (10) wherein the positive reservoir (27) is in use accessible to gases at least on one of the faces formed by the lateral surfaces of the cells (C2/L44-47), in which fuel gas is present (C2/L44-47) and which is separated from oxidant gases (see "protective rails to isolate anode and cathode from oxidant and fuel gases respectively" (23, 39, Figure 3 & 4), C4/L18-21, C5/L22-26).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacob Buchanan whose telephone number is (571)270-1186. The examiner can normally be reached on Monday - Thursday 7:30-5:00 and alternating Fridays 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on (571)272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. B./
Examiner, Art Unit 4133

/Keith Walker/
Examiner, Art Unit 1795